

## Claims

1. Intervertebral disk prosthesis comprising an upper part (1) and a lower part (2), characterized in that the intervertebral disk prosthesis (100) is formed from an upper part (1) and a lower part (2), the top of the upper part (1) and the bottom of the lower part (2) having essentially convexly curved surfaces (3, 3'), that the lower side of the upper part has at least partially an essentially convexly or concavely shaped spherical surface (4) while the upper side of the lower part has an essentially concavely or convexly shaped spherical surface (4'), the spherical surfaces (4, 4') having an essentially identical spherical radius (R) so that the upper part (1) and the lower part (2) adjoin one another at least partially essentially seamlessly and thus form a two-part intervertebral disk prosthesis, and that the mobility of the two vertebrae is dictated by the motion of the spherical surfaces (4, 4') against one another.

2. Intervertebral disk prosthesis as claimed in claim 1, wherein the convexly curved surfaces (3, 3') have a first coating, the surfaces being entirely or at least partially covered.

3. Intervertebral disk prosthesis as claimed in claim 2, wherein the first coating is a hydroxyl-apatite ceramic (HAK) coating, a hydroxyl-apatite ceramic (HAK) coating with beaten-on tantalum or titanium, or a tricalcium phosphate (TCP) coating.

4. Intervertebral disk prosthesis as claimed in one of claims 1 - 3, wherein the spherical surfaces (4, 4') have entirely or at least partially another coating (11) on one side at a time.

5. Intervertebral disk prosthesis as claimed in one of claims 1 - 4, wherein the spherical surfaces (4, 4') consist of different material.

6. Intervertebral disk prosthesis as claimed in one of claims 1 - 5, wherein one of the

parts (1, 2) with a convexly curved or arched surface (4, 4') has cavities (16) in which balls (15) are pivotally placed which project on the circular openings (14) of the surfaces (4, 4') and are designed for sliding on the adjoining concavely curved surface (4, 4').

7. Intervertebral disk prosthesis as claimed in one of claims 1 - 5, wherein one of the parts (1, 2) with a concavely curved or shell-like surface (4, 4') has cavities (16) in which balls (15) are pivotally placed which project on the circular openings (14) of the surfaces (4, 4') and are designed for sliding on the adjoining convexly curved surface (4, 4').

8. Intervertebral disk prosthesis as claimed in claim 6 or 7, wherein the balls (15) consist of a ceramic material, preferably of zirconium ceramic,  $\text{Al}_2\text{O}_3$  bioceramic or hardened ceramic (silicon nitride).

9. Intervertebral disk prosthesis as claimed in claim 4, wherein the other coating (11) consists of polyethylene and polypropylene, preferably of high pressure-process polyethylene (HD-PE).

10. Intervertebral disk prosthesis as claimed in claim 4, wherein the other coating (11) consists of a ceramic material, preferably of a bioceramic.

11. Intervertebral disk prosthesis as claimed in claim 9 or 10, wherein the other coating (11) is cruciform, network-like, or in concentric rings.

12. Intervertebral disk prosthesis as claimed in one of claims 1 - 11, wherein the parts (1, 2) consist of plastic, preferably of polyether ether ketone (PEEK), polyether ketone ether ketone (PEKEKK) or of polysulfone (PS) or a composite material, preferably carbon fiber-reinforced composite of (CFK/PEEK) and (CFK/PEKEKK).

13. Intervertebral disk prosthesis as claimed in one of claims 1 - 11, wherein the parts (1,

2) consist of titanium, a Ti alloy or of a Co-Cr-Ni alloy.

14. Intervertebral disk prosthesis as claimed in one of claims 1 - 11, wherein the parts (1, 2) consist of a ceramic material, preferably of zirconium ceramic,  $\text{Al}_2\text{O}_3$  bioceramic or a hardened ceramic (silicon nitride).

15. Intervertebral disk prosthesis as claimed in one of claims 1 - 14, wherein of the parts (1, 2), at least one consists of a composite material.

16. Intervertebral disk prosthesis as claimed in one of claims 1 - 15, wherein part (1) and part (2) consist of different material.

17. Intervertebral disk prosthesis as claimed in one of claims 1 - 16, wherein part (1) and the spherical surface (4), as well as part (2) and the spherical surface (4') consist of different material.

18. Intervertebral disk prosthesis as claimed in one of claims 1 - 17, wherein the parts (1, 2) are interchangeable.

19. Intervertebral disk prosthesis as claimed in one of claims 1 - 18, wherein it is self-centering between the vertebral bodies.

20. Intervertebral disk prosthesis as claimed in one of claims 1 - 19, wherein the upper part (1) and the lower part (2) adjoin one another at least partially seamlessly.

21. Intervertebral disk prosthesis as claimed in one of claims 1 - 20, wherein it has free spaces (19, 19') which are bordered by zones (17, 17') on the bottom and top of part (1) and (2), the free spaces (19, 19') essentially disappearing on one side at a time at maximum deflection of the parts (1, 2).

22. Intervertebral disk prosthesis as claimed in one of claims 1 - 21, wherein the part (1)

and/or the part (2) is divided into at least two parts.

23. Process for producing an intervertebral disk prosthesis as claimed in one of claims 1 - 22, wherein the spinal column is measured beforehand in the area around the damaged intervertebral disk and especially the vertebral bodies by means of a scanning process, characteristic data being determined and wherein the intervertebral disk prosthesis is designed based on the characteristic data and in this way perfect matching to the anatomy of the vertebral bodies is achieved.

24. Process as claimed in claim 23, wherein the support surfaces of the vertebral bodies are measured and the convexly curved surfaces (3, 3') are designed by means of the characteristic data.

25. Process as claimed in claim 23 or 24, wherein the heights of the adjacent intact intervertebral disks are measured and wherein the height of the intervertebral disk prosthesis (1, 2, 23, 24) is engineered by means of the characteristic data which have been determined by extrapolation.

26. Process as claimed in one of claims 22 - 25, wherein measurement, construction and surgery are carried out independently of one another in terms of time and space.